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 **Latest release**

Broad Field

03 Engineering and Related Technologies

Australian Standard Classification of Education (ASCED)

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Broad Field 03 Engineering and Related Technologies

Engineering and Related Technologies is the study of the design, manufacture, installation, maintenance and functioning of machines, systems and structures; and the composition and processing of metals, ceramics, foodstuffs and other materials. It includes the measurement and mapping of the earth's surface and its natural and constructed features.

The theoretical content of Broad Field 03 Engineering and Related Technologies includes:

- aeronautics
- engineering and manufacturing technology
- food technology
- land information technology and remote sensing
- materials science
- principles of design, drafting, planning and commissioning
- plant and machine maintenance

The main purpose of this broad field of education is to develop an understanding of the conversion of materials and energy, the measurement and representation of objects, and the operation of plant, machinery and transport systems.

This broad field comprises the narrow fields listed below but excludes:

Architecture and building. This is included in Broad Field 04 Architecture and Building.

0301 Manufacturing Engineering and Technology

Narrow Field 0301 Manufacturing Engineering and Technology

Manufacturing Engineering and Technology is the study of the planning, organisation and operation of manufacturing methods, processes, facilities and systems.

The main purpose of this narrow field of education is to develop an understanding of the design, selection, development and operation of manufacturing processes and systems, and the planning, control and management of production functions.

Courses in Narrow Field 0301 Manufacturing Engineering and Technology develop skills in:

- assembly and joining
- operating manufacturing systems to produce a product
- printing technology and production
- textile technology and production
- wood product technology and production

This narrow field comprises the following detailed fields:

030101 Manufacturing Engineering

030103 Printing

030105 Textile Making

030107 Garment Making

030109 Footwear Making

030111 Wood Machining and Turning

030113 Cabinet Making

030115 Furniture Upholstery and Renovation

030117 Furniture Polishing

030199 Manufacturing Engineering and Technology, n.e.c.

Exclusions:

Textile design. This is included in Detailed Field 100503 Textile Design.

Fashion design. This is included in Detailed Field 100505 Fashion Design.

030101 Manufacturing Engineering

Manufacturing Engineering is the study of designing, developing and organising safe and flexible manufacturing processes, systems and facilities.

Examples of subjects in this detailed field include:

- automation
- computer-aided manufacture
- flexible manufacturing systems
- general and specialised machinery
- mechanised assembly and specialised joining processes
- mechatronics

030103 Printing

Printing is the study of reproducing texts and pictorial works onto any media from original plates and masters, and producing finished publications. It includes electronic (desktop) publishing.

Examples of subjects in this detailed field include:

- binding and finishing techniques
- design, composition and layout
- operating printing machinery
- printing techniques

030105 Textile Making

Textile Making is the study of the commercial production of textiles, yarns and fabrics.

Examples of subjects in this detailed field include:

- dye and colouration techniques
- fibre technology
- textile technology
- weaving and tufting
- yarn manufacture

030107 Garment Making

Garment Making is the study of the commercial production of clothing and other apparel.

Examples of subjects in this detailed field include:

- fabric spreading
- garment assembly
- marking and cutting
- pattern construction and apparel fitting principles

030109 Footwear Making

Footwear Making is the study of designing, making and repairing shoes, boots and other footwear.

Examples of subjects in this detailed field include:

- clicking
- measurement and fitting
- footwear pattern design and cutting
- shoe repairing

Exclusions:

Footwear design. This is included in Detailed Field 100599 Graphic and Design, n.e.c.

030111 Wood Machining and Turning

Wood Machining and Turning is the study of shaping wood using various machines.

Examples of subjects in this detailed field include:

- lathe, saw, plane and router maintenance and operation
- template and jig design and construction
- sawing, planing, shaping, carving and machining wood

030113 Cabinet Making

Cabinet Making is the study of making and repairing furniture and interior fittings for buildings.

Examples of subjects in this detailed field include:

- custom-built furniture, interior fittings and fixtures
- furniture, interior fittings and cabinet reparation
- furniture and interior fittings material selection

030115 Furniture Upholstery and Renovation

Furniture Upholstery and Renovation is the study of designing, making and repairing the

soft furnishings of chairs, beds and other furniture.

Examples of subjects in this detailed field include:

- padding and furniture coverings
- upholstery machining
- decorative upholstery accessories

Exclusions:

Vehicle upholstery and trimming. This is included in Detailed Field 030513 Upholstery and Vehicle Trimming.

030117 Furniture Polishing

Furniture Polishing is the study of preparing and polishing different timber furniture surfaces.

Examples of subjects in this detailed field include:

- French polishing
- furniture stripping and mechanical buffing
- wood staining, lacquering and bleaching

030199 Manufacturing Engineering and Technology, n.e.c.

This detailed field includes all Manufacturing Engineering and Technology not elsewhere classified.

Examples of subjects in this detailed field include:

- coopering
- leatherwork
- furriery
- picture framing
- curtain and blind making

Narrow Field

0303 Process and Resources Engineering

Narrow Field 0303 Process and Resources Engineering

Process and Resources Engineering is the study of planning, designing and developing systems, processes and plant for locating and extracting minerals, oil and gas from the

earth, and for physically and chemically transforming raw materials to produce metals, alloys, petrochemicals, ceramics, polymers and other materials. It includes the industrial manufacture, processing, packaging and handling of foodstuffs, pharmaceuticals and biochemicals.

The main purpose of this narrow field of education is to develop an understanding of the theory and technology of extracting, processing and refining minerals, oil and gas; the chemical and physical properties of metals, alloys, petrochemicals, ceramics, polymers and other materials; the techniques of packaging food; and the management, regulatory and safety aspects of production.

Courses in Narrow Field 0303 Process and Resources Engineering develop skills in:

- analysing the structure, composition and properties of materials
- applying chemical and metallurgical techniques to the commercial production of metals, alloys, petrochemicals, ceramics, polymers and other materials
- developing techniques for producing and processing metals, alloys, petrochemicals, ceramics, polymers, foodstuffs and other materials
- designing, constructing and operating mines, refineries, chemical and food processing plants
- surveying mineral, oil and gas deposits to assess the economic feasibility of mining

This narrow field comprises the following detailed fields:

030301 Chemical Engineering

030303 Mining Engineering

030305 Materials Engineering

030307 Food Processing Technology

030399 Process and Resources Engineering, n.e.c.

030301 Chemical Engineering

Chemical Engineering is the study of planning, designing and developing products and processes where chemical and physical changes occur.

Examples of subjects in this detailed field include:

- process control optimisation and simulation
- laws of physical chemistry in chemical engineering
- biochemical engineering
- process plant design
- petrochemical product development

- petroleum refining

030303 Mining Engineering

Mining Engineering is the study of planning, developing, assessing, directing and managing the extraction of minerals, oil and gas from the earth.

Examples of subjects in this detailed field include:

- economic feasibility of mining mineral deposits
- mine design and construction
- gas and oil extraction methods
- mine safety

Exclusions:

Mining surveying. This is included in Detailed Field 031101 Surveying.

030305 Materials Engineering

Materials Engineering is the study of assaying, producing and refining materials, including metals, alloys, ceramics and polymers, timber, pulp and paper.

Examples of subjects in this detailed field include:

- composite materials analysis
- papermaking technology
- materials production and processing techniques
- drying, treating and grading timber
- materials testing
- metallurgy

030307 Food Processing Technology

Food Processing Technology is the study of the industrial processing, packaging and handling of food.

Examples of subjects in this detailed field include:

- smallgoods manufacturing
- fruit and vegetables, sugars and cereal product processing
- food packaging and storage principles
- dairy products manufacturing
- seafood processing

- meat inspection

Exclusions:

Butchery. This is included in Detailed Field 110105 Butchery.

Food science. This is included in Detailed Field 019905 Food Science and Biotechnology.

Wine making. This is included in Detailed Field 019905 Food Science and Biotechnology.

030399 Process and Resources Engineering, n.e.c.

This detailed field includes all Process and Resources Engineering not elsewhere classified.

Examples of subjects in this detailed field include:

- fuel technology
- pharmaceutical manufacturing

Narrow Field

0305 Automotive Engineering and Technology

Narrow Field 0305 Automotive Engineering and Technology

Automotive Engineering and Technology is the study of planning, designing, developing, producing and maintaining motor vehicles including earth moving equipment, motor cycles and small engines.

The main purpose of this narrow field of education is to develop an understanding of the theory and practice of the design, production and functioning of motor vehicles, vehicle body building, repair, painting and trimming, and maintaining and repairing motor vehicles, earth moving plant, motor cycles and small engines. It also involves developing an ability to organise, cost and complete the tasks required in the design, construction and maintenance of motor vehicles.

Courses in Narrow Field 0305 Automotive Engineering and Technology develop skills in:

- designing and developing motor vehicles, earth moving equipment, small engines and their components
- diagnosing faults in, servicing and repairing mechanical and electrical automotive systems and components
- interpreting and applying standards to the design of motor vehicles and components

- testing and evaluating vehicle performance and safety
- utilising the structural properties of materials for vehicle building

This narrow field comprises the following detailed fields:

030501 Automotive Engineering

030503 Vehicle Mechanics

030505 Automotive Electrics and Electronics

030507 Automotive Vehicle Refinishing

030509 Automotive Body Construction

030511 Panel Beating

030513 Upholstery and Vehicle Trimming

030515 Automotive Vehicle Operations

030599 Automotive Engineering and Technology, n.e.c.

030501 Automotive Engineering

Automotive Engineering is the study of designing, developing and testing motor vehicles, earth moving equipment, small engines and their components.

Examples of subjects in this detailed field include:

- engineering mathematics and science in automotive practices
- motor vehicle components and design standards
- vehicle performance and safety testing and evaluation

030503 Vehicle Mechanics

Vehicle Mechanics is the study of maintaining, diagnosing faults in, repairing and servicing motor vehicles and their components and small engines in boats, motorcycles, lawnmowers, generators and related equipment.

Examples of subjects in this detailed field include:

- automotive fitting and turning
- exhaust emission control systems
- tuning engines
- automotive air conditioning
- suspension, steering and brake systems
- tyre fitting and wheel alignments

030505 Automotive Electrics and Electronics

Automotive Electrics and Electronics is the study of installing, maintaining and repairing electrical wiring and electronic components in motor vehicles, boats and earth moving equipment.

Examples of subjects in this detailed field include:

- engine control systems and timing adjustment
- electrical and electronic equipment installation and repair
- automotive security systems and other electronic accessories
- electrical and electronic malfunction detection techniques
- batteries and charging principles
- vehicle lighting systems

030507 Automotive Vehicle Refinishing

Automotive Vehicle Refinishing is the study of preparing vehicle surfaces, mixing and matching paint colours, spray painting and detailing motor vehicles and aircraft.

Examples of subjects in this detailed field include:

- metallic and non-metallic paint technology
- protective mouldings, transfers and stet
- anti-corrosion treatment
- painted and unpainted surface preparation
- spraying techniques
- spot repairs (major and minor)

030509 Automotive Body Construction

Automotive Body Construction is the study of building bodies for motor vehicles, trailers, buses, and railway rolling stock.

Examples of subjects in this detailed field include:

- body structure
- framework construction techniques
- attaching panels to frameworks

Exclusions:

Aircraft body construction. This is included in Detailed Field 031503 Aircraft Maintenance Engineering.

030511 Panel Beating

Panel Beating is the study of repairing damaged motor vehicle bodies and replacing panels.

Examples of subjects in this detailed field include:

- damage and cost assessment
- panelbeating equipment
- panel section replacement
- forming custom panels

Exclusions:

Windscreen glazing. This is included in Detailed Field 040323 Glazing.

030513 Upholstery and Vehicle Trimming

Upholstery and Vehicle Trimming is the study of making, installing, repairing and replacing the interior trimmings and upholstery of motor vehicles, boats, aircraft and railway carriages.

Examples of subjects in this detailed field include:

- vehicle trimming principles
- seat cover repairs and manufacture
- canopy, tonneau covers, seat and squab production

030515 Automotive Vehicle Operations

Automotive Vehicle Operations is the study of driving motor vehicles including motor cycles, trucks and buses.

Examples of subjects in this detailed field include:

- advanced driver training
- motor vehicle handling
- road rules and defensive driving techniques

Exclusions:

Driving instructor training. This is included in Detailed Field 079999 Education, n.e.c.

030599 Automotive Engineering and Technology, n.e.c.

This detailed field includes all Automotive Engineering and Technology not elsewhere

classified.

Examples of subjects in this detailed field include:

- manufacturing and repairing bicycles
- automotive parts interpreting

Narrow Field

0307 Mechanical and Industrial Engineering and Technology

Narrow Field 0307 Mechanical and Industrial Engineering and Technology

Mechanical and Industrial Engineering and Technology is the study of designing, planning, installing, operating, maintaining and repairing mechanical plant, machinery and tools.

The main purpose of this narrow field of education is to develop an understanding of machines, mechanical plant and systems, the optimisation of production resources, and an understanding of fabricating, casting and welding metals.

Courses in Narrow Field 0307 Mechanical and Industrial Engineering and Technology develop skills in:

- analysing the effects of stresses and strains on machinery, plant and equipment
- designing and drafting mechanical components
- organising and operating industrial processes
- reading and interpreting blueprints and specifications in order to determine dimensions and tolerance of tools and metal articles

This narrow field comprises the following detailed fields:

030701 Mechanical Engineering

030703 Industrial Engineering

030705 Toolmaking

030707 Metal Fitting, Turning and Machining

030709 Sheetmetal Working

030711 Boilermaking and Welding

030713 Metal Casting and Patternmaking

030715 Precision Metalworking

030717 Plant and Machine Operations

030799 Mechanical and Industrial Engineering and Technology, n.e.c.

Exclusions:

Automotive engineering and mechanics. These are included in Narrow Field 0305 Automotive Engineering and Technology.

030701 Mechanical Engineering

Mechanical Engineering is the study of planning, designing and developing machines, mechanical plant and systems.

Examples of subjects in this detailed field include:

- machinery, plant and equipment stress and strain analysis
- mechanical systems and component design
- maintenance of mechanical systems
- lubrication, friction and wear

030703 Industrial Engineering

Industrial Engineering is the study of planning, designing, organising and operating industrial facilities and processes for the economic, safe and effective use of physical and human resources.

Examples of subjects in this detailed field include:

- control system design
- industrial plant design
- methods engineering

030705 Toolmaking

Toolmaking is the study of making and repairing tools, dies, jigs, fixtures and other precision parts and equipment.

Examples of subjects in this detailed field include:

- precision toolmaking tools operation
- tool dimensions and tolerances
- metals, alloys and plastics in toolmaking

030707 Metal Fitting, Turning and Machining

Metal Fitting, Turning and Machining is the study of setting up machining tools, production

machines and textile machines, operating machining tools and machines to shape metal stock and castings, and fitting and assembling the fabricated metal parts into products.

Examples of subjects in this detailed field include:

- fabricated metal parts fitting and assembling
- turning, gearcutting, milling and computer controlled machining
- shaping metal stocks

030709 Sheetmetal Working

Sheetmetal Working is the study of cutting, shaping and joining sheetmetal and other materials, and using hand tools, power tools and machines to make products and components.

Examples of subjects in this detailed field include:

- sheetmetal products construction
- stock marking techniques
- metal spinning

030711 Boilermaking and Welding

Boilermaking and Welding is the study of marking out, cutting, shaping and joining metals, and constructing and repairing steelwork structures and pressure vessels including boilers, piping systems and ships.

Examples of subjects in this detailed field include:

- welding and thermal cutting
- weld smoothing
- weld testing
- metal welding techniques
- metal section and pipe shaping

030713 Metal Casting and Patternmaking

Metal Casting and Patternmaking is the study of planning and fabricating mould patterns and cores for the production of metal castings.

Examples of subjects in this detailed field include:

- metallic and non-metallic pattern, mould and core design and fabrication
- metal moulding and casting techniques

- ferrous and non-ferrous alloy moulding, coremaking and casting

030715 Precision Metalworking

Precision Metalworking is the study of designing, fabricating, assembling, maintaining and repairing precision instruments such as locks, timepieces and firearms.

Examples of subjects in this detailed field include:

- precision instrument assembly, dismantling and repair
- calibration
- fine metal work and ornamental inscription engraving
- saw blade construction and repair

030717 Plant and Machine Operations

Plant and Machine Operations is the study of setting up, controlling and monitoring mobile and stationary plant, equipment and machinery either directly or by remote control.

Examples of subjects in this detailed field include:

- equipment cleaning, lubricating and maintenance
- forklift, tractor, front-end loader and crane operation
- equipment safety and efficiency monitoring
- pre-start-up inspection

030799 Mechanical and Industrial Engineering and Technology, n.e.c.

This detailed field includes all Mechanical and Industrial Engineering and Technology not elsewhere classified.

Examples of subjects in this detailed field include:

- farriery
- armament fitting
- blacksmithing

Narrow Field

0309 Civil Engineering

Narrow Field 0309 Civil Engineering

Civil Engineering is the study of planning, designing, testing and directing the construction

of large scale buildings and structures, and transport, water supply, pollution control and sewerage systems. It includes economic, functional and environmental considerations in the design and construction.

The main purpose of this narrow field of education is to develop an understanding of the theory and technology of civil engineering and their application to the construction process, the effects of soils, water and stress on structures, and the environmental impact of civil engineering projects. It also involves developing an ability to design, organise and co-ordinate civil engineering projects.

Courses in Narrow Field 0309 Civil Engineering develop skills in:

- analysing sites and applying the principles of soil mechanics to determine construction methods
- analysing the composition and strength of various engineering materials
- applying the principles of fluid mechanics and hydraulics to the design and construction of watercourses and dams
- designing civil engineering projects

This narrow field comprises the following detailed fields:

030901 Construction Engineering

030903 Structural Engineering

030905 Building Services Engineering

030907 Water and Sanitary Engineering

030909 Transport Engineering

030911 Geotechnical Engineering

030913 Ocean Engineering

030999 Civil Engineering, n.e.c.

030901 Construction Engineering

Construction Engineering is the study of designing and developing infrastructure such as buildings, roads, bridges, tunnels and quarries.

Examples of subjects in this detailed field include:

- airport engineering
- roads and bridges
- underground construction and tunnelling

Exclusions:

Mine construction. This is included in Detailed Field 030303 Mining Engineering.

030903 Structural Engineering

Structural Engineering is the study of the statical properties of structures and the behaviour and durability of materials used for erecting structures.

Examples of subjects in this detailed field include:

- structural systems strength, serviceability and durability
- material behaviour
- solid mechanics
- structural erection techniques
- structural loading

030905 Building Services Engineering

Building Services Engineering is the study of designing and developing infrastructure aimed at enhancing human comfort through controlling heat, light and sound in built environments.

Examples of subjects in this detailed field include:

- secure access systems
- building fire detection and suppression systems
- thermal, visual and acoustical environment in buildings
- building mechanical services
- building electrical services
- energy efficient buildings

Exclusions:

Refrigeration and air-conditioning repair. This is included in Detailed Field 031315 Refrigeration and Air Conditioning Mechanics.

030907 Water and Sanitary Engineering

Water and Sanitary Engineering is the study of designing and developing water storage and distribution systems, and sludge, effluent and waste water treatment systems.

Examples of subjects in this detailed field include:

- on-site waste water treatment
- pond and lagoon systems

- primary, secondary and tertiary municipal waste water treatments

030909 Transport Engineering

Transport Engineering is the study of planning and developing efficient transport systems.

Examples of subjects in this detailed field include:

- transport network systems evaluation
- transport facilities planning, design and operation
- public transport systems
- traffic operations and control
- traffic studies

Exclusions:

Air traffic control. This is included in Detailed Field 031507 Air Traffic Control.

030911 Geotechnical Engineering

Geotechnical Engineering is the study of analysing foundations, slopes and soil mechanics, and designing foundations.

Examples of subjects in this detailed field include:

- earth and rock slope analysis
- failure in soil
- geotechnical investigations and orientation
- geotechnical practical skills
- managing earth pressure in engineering projects

030913 Ocean Engineering

Ocean Engineering is the study of designing, constructing and maintaining coastal and ocean related projects and facilities, and designing floating, fixed and sub-sea offshore systems.

Examples of subjects in this detailed field include:

- buoy engineering
- coastal engineering
- floating and compliant platforms
- semi-submersibles

030999 Civil Engineering, n.e.c.

This detailed field includes all Civil Engineering not elsewhere classified.

Examples of subjects in this detailed field include:

- hydraulic engineering

Narrow Field

0311 Geomatic Engineering

Narrow Field 0311 Geomatic Engineering

Geomatic Engineering is the study of measuring and graphically representing natural and constructed features of the environment.

The main purpose of this narrow field of education is to develop an understanding of cadastral law, the theory and technology of surveying in determining location and position, and the theory and technology of map design and construction.

Courses in Narrow Field 0311 Geomatic Engineering develop skills in:

- developing and applying survey and design procedures for preparing survey plans
- measuring, reducing and adjusting data for various types of surveys
- developing, editing and revising maps and charts and preparing them for reproduction and publication
- researching existing records and maps to assist in determining survey requirements
- using surveying instruments to determine the position of points on the earth's surface
- using techniques such as remote sensing, photogrammetry and land information systems to prepare maps

This narrow field comprises the following detailed fields:

031101 Surveying

031103 Mapping Science

031199 Geomatic Engineering, n.e.c.

031101 Surveying

Surveying is the study of measuring and representing the shape, contours, locations and dimensions of the constructed and natural features of the earth, in the form of reports and plans.

Examples of subjects in this detailed field include:

- survey plans preparation
- survey statistics and adjustments
- land information plans and reports
- surveying mines
- geodesy
- survey data presentation

Exclusions:

Surveying of mineral deposits. This is included in Detailed Field 010705 Geophysics.

Building surveying. This is included in Detailed Field 040305 Building Surveying.

Quantity surveying. This is included in Detailed Field 040307 Building Construction Economics.

031103 Mapping Science

Mapping Science is the study of graphically representing the constructed and natural features of the earth in the form of maps.

Examples of subjects in this detailed field include:

- graphic communication techniques in map production
- cartography
- hydrography
- map and chart development and revision

031199 Geomatic Engineering, n.e.c.

This detailed field includes all Geomatic Engineering not elsewhere classified.

Examples of subjects in this detailed field include:

- geographical information systems (GIS)
- land information systems (LIS)
- photogrammetry
- remote sensing
- spatial information systems (SIS)

Narrow Field

0313 Electrical and Electronic Engineering

and Technology

Narrow Field 0313 Electrical and Electronic Engineering and Technology

Electrical and Electronic Engineering and Technology is the study of planning, designing, developing, testing, installing and maintaining electrical, electronic and communications equipment, circuits and systems. It includes designing, installing and maintaining equipment for generating and distributing electrical power.

The main purpose of this narrow field of education is to develop an understanding and practical application of the design, installation, testing, maintenance and repair of electrical, electronic and communications equipment and systems, electrical and electronic wiring, circuitry and componentry. It also involves developing an understanding of electrical safety and safety regulations.

Courses in Narrow Field 0313 Electrical and Electronic Engineering and Technology develop skills in:

- analysing the performance of electrical and electronic systems
- planning, designing and commissioning electrical and electronic circuits and systems
- installing, maintaining, repairing and operating telecommunication systems

This narrow field comprises the following detailed fields:

031301 Electrical Engineering

031303 Electronic Engineering

031305 Computer Engineering

031307 Communications Technologies

031309 Communications Equipment Installation and Maintenance

031311 Powerline Installation and Maintenance

031313 Electrical Fitting, Electrical Mechanics

031315 Refrigeration and Air Conditioning Mechanics

031317 Electronic Equipment Servicing

031399 Electrical and Electronic Engineering and Technology, n.e.c.

Exclusions:

Maintaining, fitting and repairing automotive electrics and electronics. These are included in Detailed Field 03050 Automotive Electrics and Electronics.

Aircraft electrical fitting and maintenance. This is included in Detailed Field 031503 Aircraft Maintenance Engineering.

031301 Electrical Engineering

Electrical Engineering is the study of planning, designing, developing and maintaining electrical equipment, circuits and systems.

Examples of subjects in this detailed field include:

- electrical systems analysis
- electrical circuits and systems
- electromechanical energy conversion
- frequency, voltage and power control
- high voltage technologies

031303 Electronic Engineering

Electronic Engineering is the study of planning, designing, developing and maintaining electronic equipment, machinery and systems.

Examples of subjects in this detailed field include:

- analogue systems
- electronic components and systems design
- operational amplifiers
- integrated circuit design

031305 Computer Engineering

Computer Engineering is the study of designing and constructing digital data processing hardware.

Examples of subjects in this detailed field include:

- arithmetic and logic structures
- computer architecture
- computer hardware design and construction
- computer systems engineering
- input, output and data devices
- logic design

031307 Communications Technologies

Communications Technologies is the study of communication transmission and signal systems.

Examples of subjects in this detailed field include:

- antenna technology
- broadband network technology
- digital and microwave communication systems
- fibre optic and photonic communication systems
- modem technology
- satellite communication systems

031309 Communications Equipment Installation and Maintenance

Communications Equipment Installation and Maintenance is the study of installing, maintaining, operating, diagnosing and repairing faults in telecommunications equipment, appliances, instruments and systems.

Examples of subjects in this detailed field include:

- telephone, radio and computer transmission equipment
- underground communications cabling
- broadcast station equipment operation
- fibre-optic cable jointing

031311 Powerline Installation and Maintenance

Powerline Installation and Maintenance is the study of installing, repairing, maintaining and monitoring overhead and underground electrical power distribution networks.

Examples of subjects in this detailed field include:

- overhead and underground electric powerlines and aerial equipment
- powerline fault finding
- powerline quality and performance testing
- powerline insulation

031313 Electrical Fitting, Electrical Mechanics

Electrical Fitting, Electrical Mechanics is the study of installing, maintaining, diagnosing faults in and repairing electrical wiring and equipment in domestic, commercial and industrial establishments, ships and trains.

Examples of subjects in this detailed field include:

- electrical wiring installations
- electrical units fault finding and repair
- electrical circuits compatibility and safety testing
- electrical drawing interpretation

031315 Refrigeration and Air Conditioning Mechanics

Refrigeration and Air Conditioning Mechanics is the study of installing, maintaining, diagnosing faults in and repairing domestic, commercial and industrial refrigeration, air conditioning and heating equipment.

Examples of subjects in this detailed field include:

- refrigerants
- refrigeration, air conditioning and heating equipment repair
- refrigeration systems analysis
- ventilation

Exclusions:

Air conditioning and heating system design. This is included in Detailed Field 030905 Building Services Engineering.

Automotive air conditioning. This is included in Detailed Field 030503 Vehicle Mechanics.

031317 Electronic Equipment Servicing

Electronic Equipment Servicing is the study of maintaining, diagnosing faults in and repairing computers, radio and television receivers, audio, video, and other electronic business and domestic equipment.

Examples of subjects in this detailed field include:

- electronic wiring and equipment testing
- electronic equipment installation
- electronic mechanics
- chrominance and luminance
- filters and resonance
- PC configuration

031399 Electrical and Electronic Engineering and Technology, n.e.c.

This detailed field includes all Electrical and Electronic Engineering and Technology not

elsewhere classified.

Examples of subjects in this detailed field include:

- renewable energy technology

Narrow Field

0315 Aerospace Engineering and Technology

Narrow Field 0315 Aerospace Engineering and Technology

Aerospace Engineering and Technology is the study of planning, designing, developing, assembling and maintaining aircraft structures and systems. It includes operating and directing aircraft.

The main purpose of this narrow field of education is to develop an understanding of the research, design, development, manufacture, installation, operation, maintenance and management of aircraft. It also involves developing an understanding of the structural aspects of air frames, aircraft controls and flight stability, and aircraft capability and safety under operational conditions.

Courses in Narrow Field 0315 Aerospace Engineering and Technology develop skills in:

- authorising aircraft modifications, repairs and maintenance
- conducting diagnostic tests to determine the nature of aircraft malfunctions, and maintaining and servicing aircraft engines, airframe components and systems
- designing aircraft, aircraft components and support equipment
- evaluating test flights to analyse performance and compliance to specifications and safety standards
- piloting aircraft and controlling aircraft movements

This narrow field comprises the following detailed fields:

031501 Aerospace Engineering

031503 Aircraft Maintenance Engineering

031505 Aircraft Operation

031507 Air Traffic Control

031599 Aerospace Engineering and Technology, n.e.c.

031501 Aerospace Engineering

Aerospace Engineering is the study of designing, developing and modifying aircraft.

Examples of subjects in this detailed field include:

- aerodynamics
- airframes engineering
- missile design
- propulsion
- satellite design
- spacecraft design

031503 Aircraft Maintenance Engineering

Aircraft Maintenance Engineering is the study of assembling, maintaining and repairing aircraft structures, and avionic and mechanical systems.

Examples of subjects in this detailed field include:

- aircraft auxiliary systems
- propellers and propeller systems
- aircraft instrument systems
- aircraft fabrication techniques
- aerodynamics and structural repairs

031505 Aircraft Operation

Aircraft Operation is the study of piloting and navigating aircraft.

Examples of subjects in this detailed field include:

- aircraft ground control, take-off and landing procedures
- aircraft navigation
- aircraft operation and flight procedures
- aircraft safety
- flight plans preparation

031507 Air Traffic Control

Air Traffic Control is the study of monitoring and directing ground and air aircraft movements.

Examples of subjects in this detailed field include:

- ground control systems
- air traffic communications
- pilot weather briefing
- aircraft plotting
- flight and operation recording
- flight plans clearance
- navigational aids and airports

031599 Aerospace Engineering and Technology, n.e.c.

This detailed field includes all Aerospace Engineering and Technology not elsewhere classified.

Narrow Field

0317 Maritime Engineering and Technology

Narrow Field 0317 Maritime Engineering and Technology

Maritime Engineering and Technology is the study of designing, maintaining and operating marine craft and shipboard machinery and systems.

The main purpose of this narrow field of education is to develop an understanding of designing, developing, operating, maintaining and managing marine engineering systems. It also involves developing an understanding of the operation of ships and other maritime facilities and safety under operational conditions.

Courses in Narrow Field 0317 Maritime Engineering and Technology develop skills in:

- constructing, maintaining and repairing the internal structure, steering gear and hull support systems of marine craft
- designing and developing marine engineering systems
- directing the movement of vessels and the stowage and discharge of cargoes
- operating, maintaining and managing marine engineering systems

This narrow field comprises the following detailed fields:

031701 Maritime Engineering

031703 Marine Construction

031705 Marine Craft Operation

031799 Maritime Engineering and Technology, n.e.c.

Exclusions:

Designing floating, fixed or sub-sea offshore systems. This is included in Detailed Field 030913 Ocean Engineering.

031701 Maritime Engineering

Maritime Engineering is the study of maintaining and operating shipboard machinery and systems.

Examples of subjects in this detailed field include:

- marine machinery and control systems
- ship machinery and equipment inspection
- marine engineering systems maintenance and operation
- marine mechanics
- marine auxiliary equipment and systems

031703 Marine Construction

Marine Construction is the study of fabricating, fitting out and repairing marine vessels and their structural components.

Examples of subjects in this detailed field include:

- hull form and performance
- lofting procedures
- masts, frames, decking and fittings installation
- slipway operations

031705 Marine Craft Operation

Marine Craft Operation is the study of operating ships and other marine craft and their navigation and communication systems.

Examples of subjects in this detailed field include:

- marine radio communication
- navigation and navigational aids
- vessel maneuvering, handling and stability
- seamanship
- shipboard safety
- fishing operations

031799 Maritime Engineering and Technology, n.e.c.

This detailed field includes all Maritime Engineering and Technology not elsewhere classified.

Examples of subjects in this detailed field include:

- naval architecture

Narrow Field

0399 Other Engineering and Related Technologies

Narrow Field 0399 Other Engineering and Related Technologies

This narrow field includes all Engineering and Related Technologies not elsewhere classified.

This narrow field comprises the following detailed fields:

039901 Environmental Engineering

039903 Biomedical Engineering

039905 Fire Technology

039907 Rail Operations

039909 Cleaning

039999 Engineering and Related Technologies, n.e.c.

039901 Environmental Engineering

Environmental Engineering is the study of technology concerned with the mitigation of pollution, contamination and deterioration of the environment.

Examples of subjects in this detailed field include:

- cleaner production
- erosion control and land rehabilitation technology
- noise control mechanisms in engineering projects
- waste minimisation
- waste management

Exclusions:

Environmental impact assessment. This is included in Detailed Field 050999 Environmental Studies, n.e.c.

Environmental management. This is included in Detailed Field 050901 Lands, Parks and Wildlife Management.

039903 Biomedical Engineering

Biomedical Engineering is the study of designing and manufacturing medical devices and equipment to assist in overcoming physical disabilities.

Examples of subjects in this detailed field include:

- biocompatibility of intracorporeal and extracorporeal systems
- biomaterials
- designing imaging systems
- human rehabilitation engineering

Exclusions:

Dental prosthetics. This is included in Detailed Field 060705 Dental Technology.

Orthotic and prosthetic patient assessment and prescription of orthoses and prostheses.

These are included in Detailed

Field 061799 Rehabilitation Therapies, n.e.c.

039905 Fire Technology

Fire Technology is the study of fire detection, suppression and prevention methods and equipment.

Examples of subjects in this detailed field include:

- fire detection, suppression and prevention
- fire fighting equipment and techniques
- fire hazards
- fire behaviour

039907 Rail Operations

Rail Operations is the study of driving, shunting and marshalling trains.

Examples of subjects in this detailed field include:

- train station operation
- track safety
- train examination
- principles of train management

- railway yard operation

039909 Cleaning

Cleaning is the study of removing dirt and stains from, and maintaining and restoring clothing and fabrics, and domestic, industrial and commercial assets.

Examples of subjects in this detailed field include:

- dry-cleaning
- dust reduction
- domestic cleaning
- laundry machine operation
- stains, spillages and grime removal techniques
- floor, glass and ceiling wet and dry cleaning

Exclusions:

Education primarily related to occupational health and safety. This is included in Detailed Field 061301 Occupational Health and Safety.

039999 Engineering and Related Technologies, n.e.c.

This detailed field includes all Engineering and Related Technologies not elsewhere classified.

Examples of subjects in this detailed field include:

- nuclear engineering
- railway engineering